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Global ion heating characteristics of magnetic reconnection during two tokamak plasma merging experiment HARUAKI TANAKA, HIROSHI TANABE, TARA AHMADI, QINNGHONG CAO, YASUSHI ONO, Univ of Tokyo, Y.ONO LABORATORY TEAM — The global and fine structures of ion temperature have been studied during magnetic reconnection of two high-guide-field merging tokamak plasmas: in TS-6 merging experiment. The new extensive/high-resolution ion Doppler measurement enables us to measure the global ion temperature profile of entire magnetic flux tube. In the past, the ion heating was measured just around current sheet. However, we recently found the negative electrostatic potential well exists globally in the whole downstream area of the two merging tokamak plasmas. We measured the global characteristics of ion heating in the merging tokamak area using Ar and H gases. In the case of Ar gas, Ar ions are energized up to 200eV prevailing around the whole downstream area, suggesting ion acceleration by negative potential well in global downstream region in sharp contrast with our previous results. In the case of H gas, H ions are heated in global region similarly but the external compression force cannot compress the current sheet to the order of its small Larmor radius unlike the Ar case, losing a chance to trigger fast reconnection. Its slow reconnection causes its ion heating power much lower than the Ar case.

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